

**Patent claims**

1. A short arc high-pressure discharge lamp (1, 28) for direct current operation, having a discharge vessel (2, 29) which includes two diametrically opposite necks (4; 30, 31), into which an anode (26, 36) and a cathode (7, 33), in each case made from tungsten, are fused in a gastight manner and which contains a fill comprising at least one noble gas and optionally mercury,  
5 characterized in that at least the material of the cathode tip (11, 34a), in addition to the tungsten, contains lanthanum oxide  $\text{La}_2\text{O}_3$  and at least one further oxide selected from the group consisting of hafnium oxide  $\text{HfO}_2$  and zirconium oxide  $\text{ZrO}_2$ .
- 15 2. The short arc high-pressure discharge lamp as claimed in claim 1, characterized in that the cathode material of the entire cathode (7, 34) contains  $\text{La}_2\text{O}_3$  and at least one further oxide selected from the group 20 consisting of  $\text{HfO}_2$  and  $\text{ZrO}_2$ .
- 25 3. The short arc high-pressure discharge lamp as claimed in claim 1 or 2, characterized in that the  $\text{La}_2\text{O}_3$  content of the cathode material is from 1.0 to 3.5% by weight.
- 30 4. The short arc high-pressure discharge lamp as claimed in claim 1 or 2, characterized in that the  $\text{La}_2\text{O}_3$  content of the cathode material is from 1.5 to 3.0% by weight.
- 35 5. The short arc high-pressure discharge lamp as claimed in claim 1 or 2, characterized in that the additional molar quantity of zirconium oxide  $\text{ZrO}_2$  and hafnium oxide  $\text{HfO}_2$  does not exceed that of the  $\text{La}_2\text{O}_3$  in the cathode material.

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6. The short arc high-pressure discharge lamp as claimed in claim 1 or 2, characterized in that the additional molar quantity of zirconium oxide  $ZrO_2$  and hafnium oxide  $HfO_2$  amounts to at least 2% of the molar 5 quantity of the  $La_2O_3$ .

7. The short arc high-pressure discharge lamp as claimed in claim 1, characterized in the electrode spacing between anode (26) and cathode (7) in the 10 discharge vessel (2) is less than or equal to 8 mm.

8. The short arc high-pressure discharge lamp as claimed in claim 1, characterized in that the electrode spacing between anode (36) and cathode (33) in the 15 discharge vessel (29) is less than or equal to 15 mm.

9. The short arc high-pressure discharge lamp as claimed in claim 1, characterized in that the lamp current when the lamp (1, 28) is operating is greater 20 than 20 A.

10. The short arc high-pressure discharge lamp as claimed in claim 1, characterized in that the form of the cathode (7) is such that when the lamp is operating 25 the current density  $J$ , i.e. the quotient of lamp current in A and effective cathode surface area in  $mm^2$  for an area which results from a section through the cathode perpendicular to the lamp axis at a distance of 0.5 mm from the tip of the cathode, satisfies the 30 following equation:

$5 \leq J \leq 150$  in the case of a mercury/noble gas fill

$25 \leq J \leq 200$  in the case of a pure noble gas fill.